

Claims

1. A representation of a macro for an integrated circuit layout, the representation defining sub-circuit cells of a module having a predefined functionality, wherein said
5 sub-circuit cells include at least one reusable circuit cell configured such that when said predefined functionality of said module is not used, said reusable circuit cell is available for re-use.
2. The representation of claim 1, wherein said reusable circuit cell has an input
10 terminal and an output terminal accessible by a user definable interconnection layer of said integrated circuit layout.
3. The representation of claim 1, wherein said reusable circuit cell comprises a
15 buffer.
4. The representation of claim 1, wherein said reusable circuit cell comprises an
inverter.
5. A computer based design tool for generating a design representation of a macro
20 for inclusion in an integrated circuit layout, the macro having a predefined functionality and comprising a plurality of sub-circuit cells, wherein the tool is configured to:
generate said design representation of said macro such that at least one of said
sub-circuit cells is reusable when said predefined functionality of said module is not used.
- 25 6. The computer based design tool of claim 5, wherein said tool is further configured to generate for said reusable sub-circuit cell, a representation of an input terminal and a representation of an output terminal for connecting said reusable sub-circuit cell to a user defined layer of said integrated circuit layout.
- 30 7. The computer based design tool of claim 5, wherein said reusable sub-circuit cell comprises a buffer.

8. The computer based design tool of claim 5, wherein said reusable sub-circuit cell comprises an inverter.

5 9. The computer based design tool of claim 5, wherein said design tool is configured to generate a plurality of said design representations of said macro in which different numbers of said sub-circuit cells are reusable cells.

10 10. The computer based design tool of claim 5, wherein said design tool is configured to generate a second design representation of said macro in which none of said sub-circuit cells are reusable cells.

15 11. The computer based design tool of claim 5, wherein said design tool is further configured to generate a parameter defining a reuse permission for said reusable sub-circuit cell.

12. The computer based design tool of claim 11, wherein said reuse permission comprises a permission to use said reusable sub-circuit cell as a repeater cell for routing.

20 13. The computer based design tool of claim 11, wherein said reuse permission comprises a permission to reuse said reusable sub-circuit cell as a fully reusable cell.

25 14. A computer based design tool for automatically designing a physical routing of conductive paths across a predesigned integrated circuit slice, wherein the tool is configured to route one of more of said conductive paths over an area of unused circuit cells defining a circuit module whose functionality is not used, by:

(a) identifying an unused circuit cell of said circuit module that is reusable as a first repeater cell;

30 (b) placing a first connection path extending over a first portion of said area to an input terminal of said first repeater cell, and

(c) placing a second connection path extending over a second portion of said area from an output terminal of said first repeater cell.

15. The computer-based design tool of claim 14, wherein said tool is configured to
5 place said first connection path and said second connection path in one or more user specified layers of said integrated circuit slice.

16. The computer based design tool of claim 14, wherein said first repeater cell comprises a buffer circuit cell.

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17. The computer based design tool of claim 14, wherein said first repeater cell comprises an inverter circuit cell.

18. The computer based design tool of claim 14, wherein said tool is further
15 configured to:

(d) identify a second unused circuit cell of said circuit module that is reusable as a second repeater cell in combination with said first repeater cell;

(e) place said second connection path to extend from said output terminal of said first repeater cell to an input terminal of said second repeater cell; and

20 (f) place a third connection path extending over a third portion of said area from an output terminal of said second repeater cell.

19. The computer based design tool of claim 18, wherein said first and second repeater cells are of the same circuit type.

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20. The computer based design tool of claim 19, wherein said first and second repeater cells are inverter circuit cells.

21. A method for designing a macro for inclusion in an integrated circuit, the method
30 comprising the steps of:

generating a design representation of said macro to (i) provide a predefined functionality, and (ii) comprise a plurality of sub-circuit cells; and

configuring at least one of said sub-circuit cells as a reusable sub-circuit cell when said predefined functionality is not used.

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22. The method of claim 21, wherein the step of generating said design representation comprises generating a plurality of design representations of said macro in which different numbers of said sub-circuit cells are reusable cells.

10 23. The method of claim 21, wherein further comprising generating a second design representation of said macro in which none of said sub-circuit cells are reusable cells.

24. The method of claim 21, further comprising a step of generating a parameter defining a reuse permission for said reusable sub-circuit cell.

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